

WE CLAIM:

1. An apparatus for processing a television signal, wherein the television signal comprises programs and commercials, the apparatus
5 comprising:

receiving means for receiving a television signal;

detecting means for detecting a commercial candidate section
in the television signal;

- determining means for determining characteristics of the
10 commercial candidate section; and

judgement means for judging whether or not the commercial
candidate section is a commercial, based on the characteristics
detected by the determining means.

- 15 2. The apparatus of claim 1, wherein:

the commercial candidate section comprises scene changes;

and

the determining means comprises means for determining a
frequency of the scene changes in the commercial candidate section.

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3. The apparatus of claim 1, wherein the determining means
comprises:

periodicity detecting means for detecting whether or not the
audio signal in the commercial candidate section has a periodicity;

- 25 and

periodicity calculation means for calculating the periodicity
detected by the periodicity detecting means.

4. The apparatus of claim 1, wherein:

the commercial candidate section comprises an audio signal with periodicity; and

the determining means comprises means for determining a
5 degree of continuity of the periodicity of the audio signal.

5. The apparatus of claim 1, wherein:

the commercial candidate section comprises a video signal with repetition; and

10 the determining means comprises means for determining the repetition of the video signal in the commercial candidate section.

6. The apparatus of claim 1, wherein the determining means comprises means for determining whether or not a telop exists in the
15 video signal of the commercial candidate section.

7. The apparatus of claim 1, wherein the determining means comprises means for determining whether or not a character exists in the video signal of the commercial candidate section.

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8. The apparatus of claim 1, wherein the determining means comprises means for determining a quietness rate in the commercial candidate section.

25 9. The apparatus of claim 1, wherein:

the television signal comprises quiet frames; and

the detecting means comprises means for detecting quiet frames of the television signal which are disposed between a program and a commercial candidate section.

10. An apparatus for processing a television signal, wherein the television signal comprises programs, commercials and scene changes, the apparatus comprising:

receiving means for receiving a television signal;

5 commercial candidate section detecting means for detecting a commercial candidate section in the television signal;

frequency determining means for determining a frequency of scene changes in the commercial candidate section and for increasing a commercial characteristic value if the frequency of scene changes is above a predetermined level;

10 periodicity determining means for determining whether or not the audio signal in the commercial candidate section has a periodicity, for calculating a level of periodicity detected and for increasing a commercial characteristic value if the calculated periodicity is above a predetermined level;

15 continuity determining means for determining a level of continuity of the periodicity of the audio signal in the commercial candidate section and for increasing a commercial characteristic value if the continuity is above a predetermined level;

20 repetition determining means for determining a level of repetition of the video signal in the commercial candidate section and for increasing a commercial characteristic value if the repetition is above a predetermined level;

25 telop detecting means for detecting a telop in the video signal of the commercial candidate section and for increasing a commercial characteristic value if a telop is detected;

character detecting means for detecting a character in the video signal of the commercial candidate section and for increasing a commercial characteristic value if a character is detected;

quietness rate determining means for determining the quietness rate of the commercial candidate section and for increasing a commercial characteristic value if the quietness rate is below a predetermined level; and

- 5 judgement means for judging whether or not the commercial candidate section is a commercial, based on the commercial characteristic value resulting from the operations of the frequency determining means, the periodicity determining means, the continuity determining means, the repetition determining means, the telop
10 determining means, the character determining means and the quietness rate determining means.

11. An apparatus for processing a television signal, wherein the television signal comprises an audio signal and a video signal, the
15 apparatus comprising:
 receiving means for receiving the television signal;
 determining means for determining a quiet threshold value from the television signal;
 comparing means for making a comparison of the audio signal
20 and the quiet threshold value; and
 judging means for judging whether or not a portion of the television signal is a commercial candidate section according to the comparison.

- 25 12. The apparatus of claim 11, wherein:
 the television signal comprises scene changes;
 the determining means comprises means for detecting the scene changes and means for detecting the audio signal during the scene changes; and

the determining means determines the quiet threshold value based on the audio signal at the scene changes.

13. The apparatus of claim 11, wherein:

5 the television signal comprises an audio multiplex mode signal;
the determining means comprises means for detecting the audio multiplex mode from the audio multiplex mode signal and means for detecting the audio signal when the audio multiplex mode changes; and

10 the determining means determines the quiet threshold value based on the audio signal at the time the audio multiplex mode changes.

14. The apparatus of claim 11, wherein:

15 the television signal comprises a program start time;
the determining means comprises means for detecting the program start time and means for detecting the audio signal at the program start time; and

20 the determining means determines the quiet threshold value based on the audio signal at the program start time.

15. The apparatus of claim 11, wherein:

the television signal comprises a program end time;
the determining means comprises means for detecting the program end time and means for detecting the audio signal at the program end time; and

25 the determining means determines the quiet threshold value based on the audio signal at the program end time.

16. The apparatus of claim 11, wherein:
the television signal comprises an AGC signal;
the determining means comprises means for detecting the
AGC signal and means for detecting the audio signal; and
5 the determining means determines the quiet threshold value
based on the audio signal and the AGC signal.

17. The apparatus of claim 11, wherein:
the video signal comprises a brightness level;
10 the determining means comprises means for determining the
brightness level and means for detecting the audio signal; and
the determining means determines the quiet threshold value
based on the audio signal and the brightness level.

18. The apparatus of claim 11, wherein:
the television signal is organized in channels;
the determining means comprises selecting means for
selecting one or more channels of the television signal; and
the determining means determines the quiet threshold value
20 based on the audio signal of each channel selected by the selecting
means.

19. The apparatus of claim 18, wherein the determining means
determines the quiet threshold value at a predetermined time interval.

20. The apparatus of claim 18, further comprising:
storing means for storing a previous quiet threshold value;
quiet threshold value comparing means for determining
whether the new quiet threshold value based on the audio portion of

each selected channel of the television signal is smaller than the previous quiet threshold value; and

means for outputting the new quiet threshold value to the storing means if the quiet threshold value comparing means
5 determines that the new quiet threshold value is smaller than the previous quiet threshold value.

21. An apparatus for processing a television signal, wherein the television signal comprises programs and commercials, the apparatus
10 comprising:

a receiver for receiving a television signal;

a first detector for detecting a commercial candidate section in the television signal;

a second detector for detecting characteristics of the commercial candidate section; and
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a judgment circuit for judging whether or not the commercial candidate section is a commercial, based on the characteristics detected by the second detector.

20 22. The apparatus of claim 21, wherein:

the commercial candidate section comprises scene changes; and

the second detector detects the frequency of the scene changes in the commercial candidate section.

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23. The apparatus of claim 21, wherein:

the commercial candidate section comprises an audio signal which has a periodicity; and

the second detector detects the periodicity of the audio signal in the commercial candidate section.

24. The apparatus of claim 21, wherein:

5 the commercial candidate section comprises an audio signal with periodicity; and

the second detector detects a continuity of the periodicity of the audio signal in the commercial candidate section.

10 25. The apparatus of claim 21, wherein:

the commercial candidate section comprises a video signal with repetition; and

the second detector detects repetition of the video signal in the commercial candidate section.

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26. The apparatus of claim 21, wherein the second detector determines whether or not a telop exists in the video signal of the commercial candidate section.

20 27. The apparatus of claim 21, wherein the second detector determines whether or not a character exists in the video signal of the commercial candidate section.

28. The apparatus of claim 21, wherein the second detector
25 detects a quietness rate of the commercial candidate section.

29. The apparatus of claim 21, wherein:

the television signal comprises quiet frames; and

the first detector detects quiet frames of the television signal

which are disposed between a program and a commercial candidate section.

30. An apparatus for processing a television signal, wherein the television signal comprises programs, commercials and scene changes, the apparatus comprising:
- a receiver for receiving a television signal;
 - a commercial candidate section detecting circuit for detecting a commercial candidate section in the television signal;
 - 10 a commercial characteristic value counter for storing a previous commercial characteristic value, for receiving a commercial characteristic value signal and for adding a commercial characteristic value from the commercial characteristic value signal to the previous commercial characteristic value;
 - 15 a frequency determining circuit for determining a frequency of scene changes in the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if the frequency of scene changes is above a predetermined level;
 - 20 a periodicity determining circuit for detecting whether or not the audio signal in the commercial candidate section has a periodicity, for calculating a level of periodicity detected and for sending a commercial characteristic value signal to the commercial characteristic value counter if the calculated periodicity is above a
 - 25 predetermined level;
 - a continuity determining circuit for determining a level of continuity of the periodicity of the audio signal in the commercial candidate section and for sending a commercial characteristic value

signal to the commercial characteristic value counter if the continuity is above a predetermined level;

5 a repetition determining circuit for determining a level of repetition of the video signal in the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if the repetition is above a predetermined level;

10 a telop detecting circuit for detecting a telop in the video signal of the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if a telop exists;

15 a character detecting circuit for detecting a character in the video signal of the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if a character is detected;

20 a quietness rate determining circuit for determining the quietness rate of the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if the quietness rate is below a predetermined level; and

a judgement circuit for judging whether or not the commercial candidate section is a commercial, based on the commercial characteristic value in the commercial characteristic value counter.

25 31. An apparatus for processing a television signal, wherein the television signal comprises an audio portion, the apparatus comprising:

a receiver for receiving the television signal;

a quiet threshold value determining circuit for determining a quiet threshold value from the television signal;

a comparator for making a comparison of the audio portion of the television signal and the quiet threshold value; and

5 a judging circuit for judging whether or not a portion of the television signal is a commercial candidate section according to the comparison.

32. The apparatus of claim 31, wherein:

10 the television signal comprises scene changes;

the quiet threshold value determining circuit comprises a scene change detector and an amplitude detector for measuring the amplitude of the audio portion of the television signal during the scene changes; and

15 the quiet threshold value determining circuit determines the quiet threshold value based on the audio portion of the television signal at the scene changes.

33. The apparatus of claim 31, wherein:

20 the television signal comprises an audio multiplex mode signal;

the quiet threshold value determining circuit comprises an audio multiplex mode detector for determining the state of the audio multiplex mode signal and an amplitude detector for measuring the amplitude of the audio signal when the audio multiplex mode

25 changes; and

the quiet threshold value determining circuit determines the quiet threshold value based on the audio signal at the time the audio multiplex mode changes.

34. The apparatus of claim 31, wherein:

the television signal comprises a program start time;

the quiet threshold value determining circuit comprises a
program start time detector and an amplitude detector for measuring
the amplitude of the audio signal the audio signal at the program
start time; and

the quiet threshold value determining circuit determines the
quiet threshold value based on the amplitude of the audio signal at
the program start time.

35. The apparatus of claim 31, wherein:

the television signal comprises a program end time;

the quiet threshold value determining circuit comprises a
program end time detector and an amplitude detector for measuring
the amplitude of the audio signal the audio signal at the program end
time; and

the quiet threshold value determining circuit determines the
quiet threshold value based on the amplitude of the audio signal at
the program end time.

36. The apparatus of claim 31, wherein:

the television signal comprises an AGC signal;

the quiet threshold value determining circuit comprises a
voltage detector for detecting amplitude of the AGC signal and an
amplitude detector for measuring the amplitude of the audio signal;
and

the quiet threshold value determining circuit determines the
quiet threshold value based on the audio signal and the AGC signal.

37. The apparatus of claim 31, wherein:

the video signal comprises a brightness level;

the quiet threshold value determining circuit comprises a
brightness detection circuit for determining the brightness level of
the video signal and an amplitude detector for measuring the
amplitude of the audio signal; and

the quiet threshold value determining circuit determines the
quiet threshold value based on the amplitude and the brightness
level.

38. The apparatus of claim 31, wherein:

the television signal is organized in channels;

the quiet threshold value determining circuit comprises a
channel selector for selecting one or more channels of the television
signal; and

the quiet threshold value determining circuit determines the
quiet threshold value based on the audio portion of each channel of
the television signal selected by the selecting means.

39. The apparatus of claim 38, wherein the quiet threshold value
determining circuit determines the quiet threshold value at a
predetermined time interval.

40. The apparatus of claim 38, further comprising:

a memory for storing a previous quiet threshold value;

a quiet threshold value comparing circuit for comparing the
quiet threshold value based on the audio portion of each channel of
the television signal with the previous quiet threshold value and for
outputting the smaller of the two values to the memory.

41. A method for processing a television signal, wherein the television signal comprises programs and commercials, the method comprising:

- a receiving step of receiving a television signal;
- 5 a detecting step of detecting a commercial candidate section in the television signal;
- a determining step of determining characteristics of the commercial candidate section; and
- 10 a judgement step of judging whether or not the commercial candidate section is a commercial, based on the characteristics detected in the determining step.

42. The method of claim 41, wherein:

- the commercial candidate section comprises scene changes;
- 15 and
- the determining step comprises the step of determining the frequency of the scene changes in the commercial candidate section.

43. The method of claim 41, wherein the determining step

20 comprises:

- a periodicity determining step of determining whether or not the audio signal in the commercial candidate section has a periodicity; and
- 25 a periodicity calculating step of calculating the periodicity determined in the periodicity determining step.

44. The method of claim 41, wherein:
the commercial candidate section comprises an audio signal
which has a periodicity; and
the determining step comprises the step of determining the
5 continuity of the periodicity.

45. The method of claim 41, wherein:
the commercial candidate section comprises a video signal
which has repetition; and
10 the determining step comprises the step of determining the
amount of repetition of the video signal in the commercial candidate
section.

46. The method of claim 41, wherein the determining step
15 comprises the step of determining whether a telop exists in the video
signal of the commercial candidate section.

47. The method of claim 41, wherein the determining step
comprises the step of determining whether a character exists in the
20 video signal of the commercial candidate section.

48. The method of claim 41, wherein the determining step
comprises the step of determining a quietness rate of the commercial
candidate section.

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49. The method of claim 41, wherein:

the television signal comprises quiet frames; and

the detecting step comprises the step of detecting quiet
frames of the television signal which are disposed between a
5 program and a commercial candidate section.

50. A method for processing a television signal, wherein the
television signal comprises programs, commercials and scene
changes, the method comprising:

10 a receiving step of receiving a television signal;

a commercial candidate section detecting step of detecting a
commercial candidate section in the television signal;

a frequency determining step, comprising the steps of
determining a frequency of scene changes in the commercial
15 candidate section and of increasing a commercial characteristic value
if the frequency of scene changes is above a predetermined level;

a periodicity determining step, comprising the steps of
determining a periodicity of the audio signal in the commercial
candidate section and of increasing a commercial characteristic value
20 if the periodicity is above a predetermined level;

a continuity determining step, comprising the steps of
determining a continuity of a periodicity of the audio signal in the
commercial candidate section and of increasing a commercial
characteristic value if the continuity is above a predetermined level;

25 a repetition detecting step, comprising the steps of detecting a
repetition of the video signal in the commercial candidate section and
of increasing a commercial characteristic value if the repetition is
above a predetermined level;

a telop searching step, comprising the steps of searching for a telop in the video signal of the commercial candidate section and of increasing a commercial characteristic value if a telop is detected;

5 a character searching step, comprising the steps of searching for a character in the video signal of the commercial candidate section and of increasing a commercial characteristic value if a characters is detected;

10 a quietness rate determining step, comprising the steps of determining the quietness rate of the commercial candidate section and of increasing a commercial characteristic value if the quietness rate is below a predetermined level; and

15 a judgement step of judging whether or not the commercial candidate section is a commercial, based on the commercial characteristic value after the preceding steps are performed.

51. A method of processing a television signal, wherein the television signal comprises an audio signal and a video signal, the method comprising:

20 a receiving step of receiving the television signal;
a determining step of determining a quiet threshold value from the television signal;

a comparing step of making a comparison of the audio signal and the quiet threshold value; and

25 a judging step of judging whether or not a portion of the television signal is a commercial candidate section according to the comparison.

52. The method of claim 51, wherein the television signal comprises scene changes and wherein the determining step comprises:

- a step of detecting the scene changes;
- 5 a step of detecting the audio signal during the scene changes;
- and
- a step of determining the quiet threshold value based on the audio signal at the scene changes.

10 53. The method of claim 51, wherein the television signal comprises an audio multiplex mode signal and wherein the determining step comprises:

- a step of detecting the audio multiplex mode from the audio multiplex mode signal;
- 15 a step of detecting the audio signal when the audio multiplex mode changes; and
- a step of determining the quiet threshold value based on the audio signal at the time the audio multiplex mode changes.

20 54. The method of claim 51, wherein the television signal comprises a program start time and wherein the determining step comprises:

- a step of detecting the program start time;
- a step of detecting the audio signal at the program start time;
- 25 and
- a step of determining the quiet threshold value based on the audio signal at the program start time.

55. The method of claim 51, wherein the television signal comprises a program end time and wherein the determining step comprises:

- a step of detecting the program end time;
- 5 a step of detecting the audio signal at the program end time;
- and
- a step of determining the quiet threshold value based on the audio signal at the program end time.

10 56. The method of claim 51, wherein the television signal comprises an AGC signal and wherein the determining step comprises:

- a step of detecting the AGC signal;
- a step of detecting the audio signal; and
- 15 a step of determining the quiet threshold value based on the audio signal and the AGC signal.

57. The method of claim 51, wherein the video signal comprises a brightness level and wherein the determining step comprises:

- 20 a step of determining the brightness level;
- a step of detecting the audio signal; and
- a step of determining the quiet threshold value based on the audio signal and the brightness level.

25 58. The method of claim 51, wherein the television signal is organized in channels and wherein the determining step comprises:

- a selecting step of selecting each channel of the television signal; and
- a calculating step of calculating the quiet threshold value

based on the audio portion of each channel of the television signal selected by the selecting step.

59. The method of claim 58, wherein the calculating step
5 calculates the quiet threshold value at a predetermined time interval.

60. The method of claim 58, further comprising:
a storing step of storing a previous quiet threshold value;
a quiet threshold value comparing step of determining whether
10 the new quiet threshold value based on the audio portion of each
channel of the television signal is smaller than the previous quiet
threshold value; and
a step of outputting the new quiet threshold value to the
storing step if the new quiet threshold value is smaller than the
15 previous quiet threshold value.

61. A provision medium for providing a program which is readable
by a computer to control an apparatus to execute a detection routine
for detecting commercials included in a television broadcast, the
20 detection routine comprising:
a receiving step of receiving a television signal;
a detecting step of detecting a commercial candidate section
in the television signal;
a determining step of detecting characteristics of the
25 commercial candidate section; and
a judgement step of judging whether or not the commercial
candidate section is a commercial, based on the characteristics
detected in the determining step.

62. The provision medium of claim 61, wherein:
the commercial candidate section comprises scene changes;
and

the determining step comprises the step of determining the
5 frequency of the scene changes in the commercial candidate section.

63. The provision medium of claim 61, wherein:
the commercial candidate section comprises an audio signal
which has a periodicity; and

10 the second determining step comprises the step of determining
the periodicity of the audio signal in the commercial candidate
section.

64. The provision medium of claim 61, wherein:

15 the commercial candidate section comprises an audio signal
which has a periodicity; and

the determining step comprises the step of determining a level
of continuity of the periodicity of the audio signal in the commercial
candidate section.

20 65. The provision medium of claim 61, wherein:

the commercial candidate section comprises a video signal
which has repetition; and

the determining step comprises the step of determining a level
of repetition of the video signal in the commercial candidate section.

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66. The provision medium of claim 61, wherein the determining
step comprises the step of determining whether a telop exists in the
video signal of the commercial candidate section.

[illegible][illegible]

Introduction

[illegible][illegible]

70. A provision medium for providing a program which is readable by a computer to control an apparatus to execute a detection routine for detecting commercials included in a television broadcast, the detection routine comprising:

- 5 a receiving step of receiving a television signal;
- a commercial candidate section detecting step of detecting a commercial candidate section in the television signal;
- a frequency determining step, comprising the steps of
10 determining a frequency of scene changes in the commercial candidate section and of increasing a commercial characteristic value if the frequency of scene changes is above a predetermined level;
- a periodicity determining step, comprising the steps of
15 determining a periodicity of the audio signal in the commercial candidate section and of increasing a commercial characteristic value if the periodicity is above a predetermined level;
- a continuity determining step, comprising the steps of
20 determining a continuity of a periodicity of the audio signal in the commercial candidate section and of increasing a commercial characteristic value if the continuity is above a predetermined level;
- a repetition detecting step, comprising the steps of detecting a repetition of the video signal in the commercial candidate section and of increasing a commercial characteristic value if the repetition is above a predetermined level;
- a telop searching step, comprising the steps of searching for a
25 telop in the video signal of the commercial candidate section and of increasing a commercial characteristic value if a telop is detected;

a character searching step, comprising the steps of searching for a character in the video signal of the commercial candidate section and of increasing a commercial characteristic value if a characters is detected;

- 5 a quietness rate determining step, comprising the steps of determining the quietness rate of the commercial candidate section and of increasing a commercial characteristic value if the quietness rate is below a predetermined level; and

- 10 a judgement step of judging whether or not the commercial candidate section is a commercial, based on the commercial characteristic value after the preceding steps are performed.

71. A provision medium for providing a program which is readable by a computer to control an apparatus to execute a detection routine for detecting commercials included in a television broadcast, the
15 detection routine comprising:

- a receiving step of receiving the television signal;
 a determining step of determining a quiet threshold value from the television signal;
20 a comparing step of making a comparison of the audio signal and the quiet threshold value; and
 a judging step of judging whether or not a portion of the television signal is a commercial candidate section according to the comparison.

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72. The provision medium of claim 71, wherein the television signal comprises scene changes and wherein the determining step comprises:

- a step of detecting the scene changes;
- 5 a step of detecting the audio signal during the scene changes;
- and
- a step of determining the quiet threshold value based on the audio signal at the scene changes.

10 73. The provision medium of claim 71, wherein the television signal comprises an audio multiplex mode signal and wherein the determining step comprises:

- a step of detecting the audio multiplex mode from the audio multiplex mode signal;
- 15 a step of detecting the audio signal when the audio multiplex mode changes; and
- a step of determining the quiet threshold value based on the audio signal at the time the audio multiplex mode changes.

20 74. The provision medium of claim 71, wherein the television signal comprises a program start time and wherein the determining step comprises:

- a step of detecting the program start time;
- a step of detecting the audio signal at the program start time;
- 25 and
- a step of determining the quiet threshold value based on the audio signal at the program start time.

75. The provision medium of claim 71, wherein the television signal comprises a program end time and wherein the determining step comprises:

- a step of detecting the program end time;
- 5 a step of detecting the audio signal at the program end time;
- and
- a step of determining the quiet threshold value based on the audio signal at the program end time.

10 76. The provision medium of claim 71, wherein the television signal comprises an AGC signal and wherein the determining step comprises:

- a step of detecting the AGC signal;
- a step of detecting the audio signal; and
- 15 a step of determining the quiet threshold value based on the audio signal and the AGC signal.

20 77. The provision medium of claim 71, wherein the video signal comprises a brightness level and wherein the determining step comprises:

- a step of determining the brightness level;
- a step of detecting the audio signal; and
- a step of determining the quiet threshold value based on the audio signal and the brightness level.

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78. The provision medium of claim 71, wherein the television signal is organized in channels and wherein the determining step comprises:

5 a selecting step of selecting each channel of the television signal; and

a calculating step of calculating the quiet threshold value based on the audio portion of each channel of the television signal selected by the selecting step.

10 79. The provision medium of claim 78, wherein the calculating step calculates the quiet threshold value at a predetermined time interval.

80. The provision medium of claim 78, further comprising:

15 a storing step of storing a previous quiet threshold value;

a quiet threshold value comparing step of determining whether the new quiet threshold value based on the audio portion of each channel of the television signal is smaller than the previous quiet threshold value; and

20 a step of storing the new quiet threshold value if the new quiet threshold value is smaller than the previous quiet threshold value.